Contents

Number 1 January 1992

1 **Editorial**

3 MINI-REVIEW
The major histocompatibility complex à la carte: are there analogies to plant disease resistance genes on the menu? *Jeffery L. Dangl*

13 **Characterization and localization of laccase forms in stem and cell cultures of sycamore.** *Azeddine Driouich, Anne-Catherine Lainé, Brigitte Vian and Loic Faye*

25 **Identification of a cDNA for the plastid-located geranylgeranyl pyrophosphate synthase from *Capsicum annuum*: correlative increase in enzyme activity and transcript level during fruit ripening.** *M. Kuntz, S. Römer, C. Suire, P. Hugueney, J.H. Weil, R. Schantz and B. Camara*

35 **Excision of a transposable element from a viral vector introduced into maize plants by agroinfection.** *Wen-Hui Shen and Barbara Hohn*

43 **A single nucleotide change within a plant virus satellite RNA alters the host specificity of disease induction.** *David E. Sleat and Peter Palukaitis*

51 **Molecular characterization and expression of an alfalfa protein with sequence similarity to mammalian ERp72, a glucose-regulated endoplasmic reticulum protein containing active site sequences of protein disulphide isomerase.** *Basil S. Shorrosh and Richard A. Dixon*

59 **Comparison of homologous recombination frequencies in somatic cells of petunia and tobacco suggest two distinct recombination pathways.** *Peter Engels and Peter Meyer*

69 **Behaviour of the maize transposable element *Ac* in *Arabidopsis thaliana*.** *Caroline Dean, Christina Sjodin, Tania Page, Jonathan Jones and Clare Lister*

83 **Genetic and phenotypic characterization of *cop*1 mutants of *Arabidopsis thaliana*.** *Xing-Wang Deng and Peter H. Quail*

97 **Parallel pathways for intracellular Ca^{2+} release from the vacuole of higher plants.** *Eva Johannes, James M. Brosnan and Dale Sanders*

103 ***terminal flower*: a gene affecting inflorescence development in *Arabidopsis thaliana*.** *John Alvarez, Catherine L. Guli, Xiang-Hua Yu and David R. Smyth*

117 **The early nodulin gene *SrEnod2* from *Sesbania rostrata* is inducible by cytokinin.** *Christoph Dehio and Frans J. de Bruijn*

129 SHORT COMMUNICATION
Molecular characterization of glutathione reductase cDNAs from pea (*Pisum sativum* L.). *Gary Creissen, E. Anne Edwards, Corine Enard, Alan Wellburn and Phil Mullineaux*

133 TECHNICAL ADVANCES
Analysis of large DNA from soybean (*Glycine max* L. Merr.) by pulsed-field gel electrophoresis. *Rhonda J. Honeycutt, Bruno W.S. Sobral, Michael McClelland and Alan G. Atherly*

Number 2 March 1992

137 MINI-REVIEW
Cell adhesion, cell separation and plant morphogenesis. *J. Paul Knox*

143 ***In-situ* localization of chalcone synthase mRNA in pea root nodule development.** *Wei-Cai Yang, Hayo C.J. Canter Cremers, Peter Hogendijk, Panagiotis Katinakis, Carel A. Wijffelman, Henk Franssen, Albert Van Kammen and Ton Bisseling*

153 **Characterization of a shoot-specific, GA_3- and ABA-regulated gene from tomato.** *Lifang Shi, Robert T. Gast, Manjula Gopalraj and Neil E. Olszewski*

161 **Temporal and spatial patterns of 1,3-β-glucanase and chitinase induction in potato leaves infected by *Phytophthora infestans*.** *Martin Schröder, Klaus Hahlbrock and Erich Kombrink*

173 **Pattern of somatic transposition in a high copy *Ac* tomato line.** *Francois Belzile and John I. Yoder*

181 **Vicilin with carboxy-terminal KDEL is retained in the endoplasmic reticulum and accumulates to high levels in the leaves of transgenic plants.** *Christine I. Wandelt, M. Rafiqul I. Khan, Stuart Craig, Harmut E. Schroeder, Donald Spencer and Thomas J.V. Higgins*

193 **Characterization of cDNAs encoding two isoforms of granule-bound starch synthase which show differential expression in developing storage organs of pea and potato.** *Ian Dry, Alison Smith, Anne Edwards, Madan Bhattacharyya, Paul Dunn and Cathie Martin*

203 **Increased lysine synthesis in tobacco plants that express high levels of bacterial dihydrodipicolinate synthase in their chloroplasts.** *Orit Shaul and Gad Galili*

211 **A nuclear protein fraction binding to dA/dT-rich sequences upstream from the radish rDNA promoter.** *Manuel Echeverria, Dominique Delcasso-Tremousaygue and Michel Delseny*

221 **Maize C_4 photosynthesis involves differential regulation of phosphoenolpyruvate carboxylase genes.** *Anton R. Schäffner and Jen Sheen*

233 ***Cis*-analysis of a seed protein gene promoter: the conservative RY repeat CATGCATG within the legumin box is essential for tissue-specific expression of a legumin gene.** *Helmut Bäumlein, Istvan Nagy, Raimundo Villarroel, Dirk Inzé and Ulrich Wobus*

241 **Late embryogenesis-abundant genes encoding proteins with different numbers of hydrophilic repeats are regulated differentially by abscisic acid and osmotic stress.** *Mari Espelund, Stein Sæboe-Larssen, D. Wayne Hughes, Glenn A. Galau, Frank Larsen and Kjetill S. Jakobsen*

253 SHORT COMMUNICATION
A functionally active protein import complex from chloroplasts. *Jürgen Soll and Karin Waegemann*

257 TECHNICAL ADVANCE
Cold-plaque screening: a simple technique for the isolation of low abundance, differentially expressed transcripts from conventional cDNA libraries. *Rachel Hodge, Wyatt Paul, John Draper and Rod Scott*

261 TECHNICAL ADVANCE
***In-situ* enzyme histochemistry on plastic-embedded plant material. The development of an artefact-free β-glucuronidase assay.** *Marc De Block and Dirk Debrouwer*

Number 3 May 1992

267 MINI-REVIEW
C_3–C_4 intermediate photosynthesis: linking physiology to gene expression. *Stephen Rawsthorne*

275 MINI-REVIEW
Genetic transformation of crop plants using microprojectile bombardment. *Paul Christou*

283 **Prediction of germ-line transformation events in chimeric R_0 transgenic soybean plantlets using tissue-specific expression patterns.** *Paul Christou and Dennis E. McCabe*

291 **A 126 bp fragment of a plant histone gene promoter confers preferential expression in meristems of transgenic *Arabidopsis*.** *Rossitza Atanassova, Nicole Chaubet and Claude Gigot*

301 **Characterization of DNA sequences that mediate nuclear protein binding to the regulatory region of the *Pisum sativum* (pea) chlorophyl a/b binding protein gene *AB80*: identification of a repeated heptamer motif.** *Gerardo Argüello, Enrique García-Hernández, Mireya Sánchez, Patricio Gariglio, Luis Herrera-Estrella and June Simpson*

311 **Formation and cell lineage patterns of the shoot apex of maize.** *Gerd Bossinger, Massimo Maddaloni, Mario Motto and Francesco Salamini*

321 **Members of the acetohydroxyacid synthase multigene family of *Brassica napus* have divergent patterns of expression.** *Thérèse Ouellet, Robert G. Rutledge and Brian L. Miki*

331 **A *Brassica napus* gene family which shows sequence similarity to ascorbate oxidase is expressed in developing pollen. Molecular characterization and analysis of promoter activity in transgenic tobacco plants.** *Diego Albani, Ravinder Sardana, Laurian S. Robert, Illimar Altosaar, Paul G. Arnison and Steven F. Fabijanski*

343 **Biochemical characterization of transgenic tomato plants in which carotenoid synthesis has been inhibited through the expression of antisense RNA to pTOM5.** *Peter Bramley, Chantal Teulieres, Ian Blain, Colin Bird and Wolfgang Schuch*

351 **Differential response of maize catalases and superoxide dismutases to the photoactivated fungal toxin cercosporin.** *John D. Williamson and John Scandalios*

359 **Molecular analysis of the avirulence gene *avr9* of the fungal tomato pathogen *Cladosporium fulvum* fully supports the gene-for-gene hypothesis.** *Guido F.J.M. Van den Ackerveken, Jan A.L. Van Kan and Pierre J.G.M. De Wit*

367 **Cloning and characterization of the gene encoding the endopolygalacturonase-inhibiting protein (PGIP) of *Phaseolus vulgaris* L.** *Patrick Toubart, Angiola Desiderio, Giovanni Salvi, Felice Cervone, Lorenza Daroda, Giulia De Lorenzo, Carl Bergmann, Alan G. Darvill and Peter Albersheim*

375 **The *in-vitro* synthesized tomato shikimate kinase precursor is enzymatically active and is imported and processed to the mature enzyme by chloroplasts.** *Jürg Schmid, Andreas Schaller, Urs Leibinger, Werner Boll and Nikolaus Amrhein*

385 **Structure and growth of infection threads in the legume symbiosis with *Rhizobium leguminosarum*.** *Anne L. Rae, Paola Bonfante-Fasolo and Nicholas J. Brewin*

397 TECHNICAL ADVANCE
Stringent repression and homogeneous de-repression by tetracycline of a modified CaMV 35S promoter in intact transgenic tobacco plants. *Christiane Gatz, Claus Frohberg and Regina Wendenburg*

405 TECHNICAL ADVANCE
Artifacts in the localization of GUS activity in the anthers of petunia transformed with a CaMV 35S-GUS construct. *Joseph P. Mascarenhas and Douglas A. Hamilton*

409 TECHNICAL ADVANCE
Transgenic sugarcane plants via microprojectile bombardment. *Robert Bower and Robert G. Birch*

417 TECHNICAL ADVANCE
Complementation of *Saccharomyces cerevisiae* auxotrophic mutants by *Arabidopsis thaliana* cDNAs. *Michele Minet, Marie-Elisabeth Dufour and Francois Lacroute*

423 **Erratum concerning Volume 2, number 2, March 1992, pages 211–219,** *Echeverria* et al.

Number 4 July 1992

425 **Temporal and spatial control of expression of anthocyanin biosynthetic genes in developing flowers of *Antirrhinum majus*.** *David Jackson, Keith Roberts and Cathie Martin*

435 **A mutant of *Arabidopsis* which is defective in seed development and storage protein accumulation is a new *abi3* allele.** *Eiji Nambara, Satoshi Naito and Peter McCourt*

443 **Bean homologs of the mammalian glucose-regulated proteins: induction by tunicamycin and interaction with newly synthesized seed storage proteins in the endoplasmic reticulum.** *Leone D'Amico, Barbara Valsasina, M. Gloria Daminati, M. Serena Fabbrini, Gianpaolo Nitti, Roberto Bollini, Aldo Ceriotti and Alessandro Vitale*

457 **Tobacco lines with high copy number of replicating recombinant geminivirus vectors after biolistic DNA delivery.** *Ivan F. Kanevski, Sanjay Thakur, Laurey Cosowsky, Garry Sunter, Clare Brough, David Bisaro and Pal Maliga*

465 **The methylation patterns of chromosomal integration regions influence gene activity of transferred DNA in *Petunia hybrida*.** *F. Pröls and P. Meyer*

477 **Promoter elements involved in environmental and developmental control of potato proteinase inhibitor II expression.** *Ruth Lorberth, Christian Dammann, Marcus Ebneth, Simone Amati and Jose J. Sánchez-Serrano*

487 ***Lotus japonicus*, an autogamous, diploid legume species for classical and molecular genetics.** *Kurt Handberg and Jens Stougaard*

497 **A genetically defined *trans*-acting locus regulates *S*-locus function in *Brassica*.** *Mikhail E. Nasrallah, Muthugapatti K. Kandasamy and June B. Nasrallah*

507 **PEPC-mediated carbon fixation in transmitting tract cells reflects style–pollen tube interactions.** *Marcel A.K. Jansen, Guido Sessa, Shmuel Malkin and Robert Fluhr*

517 **Metabolic regulation of rice α-amylase and sucrose synthase genes *in planta*.** *Erik E. Karrer and Raymond Rodriguez*

525 **The TACPyAT repeats in the chalcone synthase promoter of *Petunia hybrida* act as a dominant negative *cis*-acting module in the control of organ-specific expression.** *Ingrid M. van der Meer, Margreet Brouwer, Cornelis E. Spelt, Joseph N.M. Mol and Antione R. Stuitje*

537 **Developmental control of the β-phaseolin gene requires positive, negative, and temporal seed-specific transcriptional regulatory elements and a negative element for stem and root expression.** *Mark D. Burow, Partha Sen, Caryl A. Chlan and Norimoto Murai*

549 **Potato virus X as a vector for gene expression in plants.** *Sean Chapman, Tony Kavanagh and David Baulcombe*

559 **Inhibition of tobacco nitrite reductase activity by expression of antisense RNA.** *Hervé Vaucheret, Jocelyne Kronenberger, Andrée Lepingle, Françoise Vilaine, Jean-Pierre Boutin and Michel Caboche*

571 **Expression of *E. coli* inorganic pyrophosphatase in transgenic plants alters photoassimilate partitioning.** *Uwe Sonnewald*

583 **Construction and expression of nonsense suppressor tRNAs which function in plant cells.** *Scott Franklin, Tsai Yun Lin and William R. Folk*

589 **Molecular comparison of monocot and dicot U1 and U2 snRNAs.** *Michael A. Musci, Daniel B. Egeland and Mary A. Schuler*

601 **RFLP markers for sugar beet breeding: chromosomal linkage maps and location of major genes for rhizomania resistance, monogermy and hypocotyl colour.** *E. Barzen, W. Mechelke, E. Ritter, J.F. Seitzer and F. Salamini*

613 SHORT COMMUNICATION
A *Brassica S*-locus related gene promoter directs expression in both pollen and pistil of tobacco. *Rachel M. Hackett, Michael J. Lawrence and F. Christopher H. Franklin*

619 SHORT COMMUNICATION
Maternal mRNA and early development in *Fucus serratus*. *A.K. Masters, A.D. Shirras and A.M. Hetherington*

623 TECHNICAL ADVANCE
An improved procedure for the isolation of plasmodesmata embedded in clean maize cell walls. *Guy Kotlizky, Shomrat Shurtz, Avital Yahalom, Zvi Malik, Otto Traub and Bernard L. Epel*

631 TECHNICAL ADVANCE
Transformation of cereals via *Agrobacterium* and the pollen pathway: a critical assessment. *Peter Langridge, Reinhold Brettschneider, Paul Lazzeri and Horst Lörz*

639 **Erratum concerning Volume 2, Number 2, March 1992, pages 241–252,** *Espelund* et al.

Number 5 September 1992

641 **Editorial**

643 MINI-REVIEW
Salicylic acid and plant disease resistance. *Jocelyn Malamy and Daniel F. Klessig*

655 **Dichloroisonicotinic and salicylic acid, inducers of systemic acquired resistance, enhance fungal elicitor responses in parsley cells.** *Heinrich Kauss, Elke Theisinger-Hinkel, Roswitha Mindermann and Uwe Conrath*

661 **Endosperm differentiation in barley wild-type and *sex* mutants.** *Marie Bosnes, Fredrik Weideman and Odd-Arne Olsen*

675 **A protein from maize labeled with azido-IAA has novel β-glucosidase activity.** *Narciso Campos, Laszlo Bako, Joachim Feldwisch, Jeff Schell and Klaus Palme*

685 **A *Brassica napus* transcript encoding a protein related to the Künitz protease inhibitor family accumulates upon water stress in leaves, not in seeds.** *Willa Lee Downing, Fabienne Mauxion, Marie-Odile Fauvarque, Marie-Pierre Reviron, Dominique de Vienne, Nicole Vartanian and Jérôme Giraudat*

695 **Genomic divergence of allopatric sibling species studied by molecular cytogenetics of their F_1 hybrids.** *A.S. Parokonny, A.Y. Kenton, L. Meredith, S.J. Owens and M.D. Bennett*

705 **PCR-aided genomic sequencing of 5′ subterminal sequences of the maize transposable element *Activator (Ac)* in transgenic tobacco plants.** *Thomas Ott, Birgit Nelsen-Salz and Hans-Peter Döring*

713 **Characterization of a pollen-specific cDNA from sunflower encoding a zinc finger protein.** *Rachel Baltz, Claire Domon, Datta T.N. Pillay and André Steinmetz*

723 **Cell-cycle-dependent changes in labelling of specific phosphoproteins by the monoclonal antibody MPM-2 in plant cells.** *J.A. Traas, A.F. Beven, J.H. Doonan, J. Cordewener and P.J. Shaw*

733 **The *ptl1* gene expressed in the transmitting tissue of *Antirrhinum* encodes an extensin-like protein.** *Timothy C. Baldwin, Enrico S. Coen and Hugh G. Dickinson*

741 **Direct evidence for pressure-generated closure of plasmodesmata.** *K.J. Oparka and D.A.M. Prior*

751 **The *Arabidopsis HSP18.2* promoter/*GUS* gene fusion in transgenic *Arabidopsis* plants: a powerful tool for the isolation of regulatory mutants of the heat-shock response.** *Taku Takahashi, Satoshi Naito and Yoshibumi Komeda*

763 **The adenine nucleotide translocator of higher plants is synthesized as a large precursor that is processed upon import into mitochondria.** *Brenda M. Winning, Caroline J. Sarah, P. Edward Purdue, Christopher D. Day and Christopher J. Leaver*

775 **Mutagenesis of a race-specific rust resistance gene in *Antirrhinum majus* using a transposon-tagging protocol.** *E.A.B. Aitken, J.A. Callow and H.J. Newbury*

783 **Co-immunolocalization of topoisomerase II and chloroplast DNA in developing, dividing and mature wheat chloroplasts.** *Joanne L. Marrison and Rachel M. Leech*

791 **Molecular analyses of a barley multigene family homologous to the yeast protein kinase gene *SNF1*.** *Nigel G. Halford, Jesus Vicente-Carbajosa, Paolo A. Sabelli, Peter R. Shewry, Ulrich Hannappel and Martin Kreis*

799 **Transgenic tobacco plants expressing *rgp1*, a gene encoding a *ras*-related GTP-binding protein from rice, show distinct morphological characteristics.** *I. Kamada, S. Yamauchi, S. Youssefian and H. Sano*

809 SHORT COMMUNICATION
Efficient initiation of translation non-AUG triplets in plant cells. *Karl Gordon, Johannes Fütterer and Thomas Hohn*

815 SHORT COMMUNICATION
A pathogen-induced gene of barley encodes a protein showing high similarity to a protein kinase regulator. *Jakob Brandt, Hans Thordal-Christensen, Knud Vad, Per L. Gregersen and David B. Collinge*

821 SHORT COMMUNICATION
***In-situ* localization of cyanogenic β-glucosidase (linamarase) gene expression in leaves of cassava (*Manihot esculenta* Cranz) using non-isotopic riboprobes.** *A. Pancoro and M.A. Hughes*

829 TECHNICAL ADVANCE
The culture response of *Arabidopsis thaliana* protoplasts is determined by the growth conditions of donor plants. *Jean Masson and Jerzy Paszkowski*

835 TECHNICAL ADVANCE
Rapid analysis of plant gene expression by a novel reverse transcriptase–PCR method. *Craig G. Simpson, Ralph Sinibaldi and John W.S. Brown*

Number 6 November 1992

837 **The promoter of the rice gene *GOS2* is active in various different monocot tissues and binds rice nuclear factor ASF-1.** *B. Sylvia de Pater, Frits van der Mark, Saskia Rueb, Fumiaki Katagiri, Nam-Hai Chua, Rob A. Schilperoort and Lambert A.M. Hensgens*

845 **Molecular characterization of cDNA encoding for adenylate kinase of rice (*Oryza sativa* L.).** *Maki Kawai, Shin-ichiro Kidou, Atsushi Kato and Hirofumi Uchimiya*

855 **Expression pattern of a tobacco lipid transfer protein gene within the shoot apex.** *Andrew J. Fleming, Therese Mandel, Sylvia Hofmann, Peter Sterk, Sacco C. de Vries and Cris Kuhlemeier*

863 **Genome reorganization in *Nicotiana* asymmetric somatic hybrids analysed by *in situ* hybridization.** *A.S. Parokonny, A.Y. Kenton, Y.Y. Gleba and M.D. Bennett*

875 **A functional promoter shift of a chloroplast gene: a transcriptional fusion between a novel *psbA* gene copy and the *trnK* (UUU) gene in *Pinus contorta*.** *Jonas Lidholm and Petter Gustafsson*

887 **Use of a nuclear-targeted β-glucuronidase fusion protein to demonstrate vegetative cell-specific gene expression in developing pollen.** *David Twell*

893 **Reductant for glutamate synthase is generated by the oxidative pentose phosphate pathway in non-photosynthetic root plastids.** *C.G. Bowsher, E.L. Boulton, J. Rose, S. Nayagam and M.J. Emes*

899 **Differential usage of photoreceptors for chalcone synthase gene expression during plant development.** *Hanns Frohnmeyer, Bruno Ehmann, Thomas Kretsch, Martin Rocholl, Klaus Harter, Akira Nagatani, Masaki Furuya, Alfred Batschauer, Klaus Hahlbrock and Eberhard Schäfer*

907 **Temporal and spatial expression of a thiolprotease gene during pea ovary senescence, and its regulation by gibberellin.** *A. Granell, N. Harris, A.G. Pisabarro and J. Carbonell*

917 **Differential gene expression during somatic embryogenesis in *Digitalis lanata* analyzed by *in vivo* and *in vitro* protein synthesis.** *Christiane Reinbothe, Annegret Tewes, Martin Luckner and Steffen Reinbothe*

927 **Four distinct nuclear proteins recognize *in vitro* the proximal promoter of the bean seed storage protein *β-phaseolin* gene conferring spatial and temporal control.** *Yasushi Kawagoe and Norimoto Murai*

937 **A gibberellin-regulated gene from wheat with sequence homology to cathepsin B of mammalian cells.** *Francisco J. Cejudo, George Murphy, Catherine Chinoy and David C. Baulcombe*

949 **A multi-recombination model for the mtDNA rearrangements seen in maize cmsT regenerated plants.** *Christiane M.-R. Fauron, Mark Casper, Raymond Gesteland and Marc Albertsen*

959 **Dispersed lignin in tracheary elements treated with cellulose synthesis inhibitors provides evidence that molecules of the secondary cell wall mediate wall patterning.** *James G. Taylor, T. Page Owen Jr, Linda T. Koonce and Candace H. Haigler*

971 **The root-knot nematode resistance gene (*Mi*) in tomato: construction of a molecular linkage map and identification of dominant cDNA markers in resistant genotypes.** *Jeong-Yau Ho, Rob Weide, Helen M. Ma, Monique F. van Wordragen, Kris N. Lambert, Maarten Koornneef, Pim Zabel and Valerie M. Williamson*

983 SHORT COMMUNICATION
Identification of an *S*-locus glycoprotein allele introgressed from *B. napus* ssp. *rapifera* to *B. napus* ssp. *oleifera*. *Daphne R. Goring, Paul Banks, Lynne Fallis, Chris L. Baszczynski, Wallace D. Beversdorf and Steven J. Rothstein*

991 SHORT COMMUNICATION
Appendix: a novel type of homeotic mutation affecting floral morphology. *Jean Broadhvest, Nathalie Daigle, Marilyn Martin, George W. Haughn and François Bernier*

999 SHORT COMMUNICATION
RNA binding characteristics of a 16 kDa glycine-rich protein from maize. *M. Dolors Ludevid, Miguel Angel Freire, Jordi Gómez, Christopher G. Burd, Fernando Albericio, Ernest Giralt, Gideon Dreyfuss and Montserrat Pagès*

1005 TECHNICAL ADVANCE
Random sequencing of cDNA libraries reveals a variety of expressed genes in cultured cells of rice (*Oryza sativa* L.). *Hirofumi Uchimiya, Shin-ichiro Kidou, Tetsuo Shimazaki, Satoshi Aotsuka, Susumu Takamatsu, Ritsuko Nishi, Hiroshi Hashimoto, Yuko Matsubayashi, Naomi Kidou, Masaaki Umeda and Atsushi Kato*

1011 **Author index**

1017 **Subject index**